NEW LONDON INSTRUMENT CO. INC.

NEW LONDON, CONNECTICUT

INSTRUCTIONS
FOR
INSTALLATION & OPERATION
OF

FREQUENCY MODULATION MONITOR
TYPE 257A

MANUFACTURED BY:
NEW LONDON INSTRUMENT COMPANY, INC.
NEW LONDON, CONNECTICUT

WARNING

HIGH VOLTAGE

is used in the operation of

this equipment

Be careful not to contact high-voltage connections or any power connections when using this equipment. Turn off the power and discharge all high-voltage capacitors before making any test connections or doing any work inside the equipment.

I - General Description

The Model 257A Frequency Modulation Monitor has been developed primarily for the calibration of FM signal generators in the frequency range from 20 to 1,000 megacycles. In addition, the instrument is also capable of performing the following operations:

a. Measurement of deviation of FM transmitters in the frequency range 20 to 1,000 mcs.

b. Measurement of modulation distortion (with external distortion analyzer) of FM signal generators and transmitters.

c. Measurement of FM noise and hum modulation of FM signal generators and transmitters in the specified frequency range.

d. Measurement of FM signal Generator and transmitter carrier shift due to modulation.

II - SPECIFICATIONS

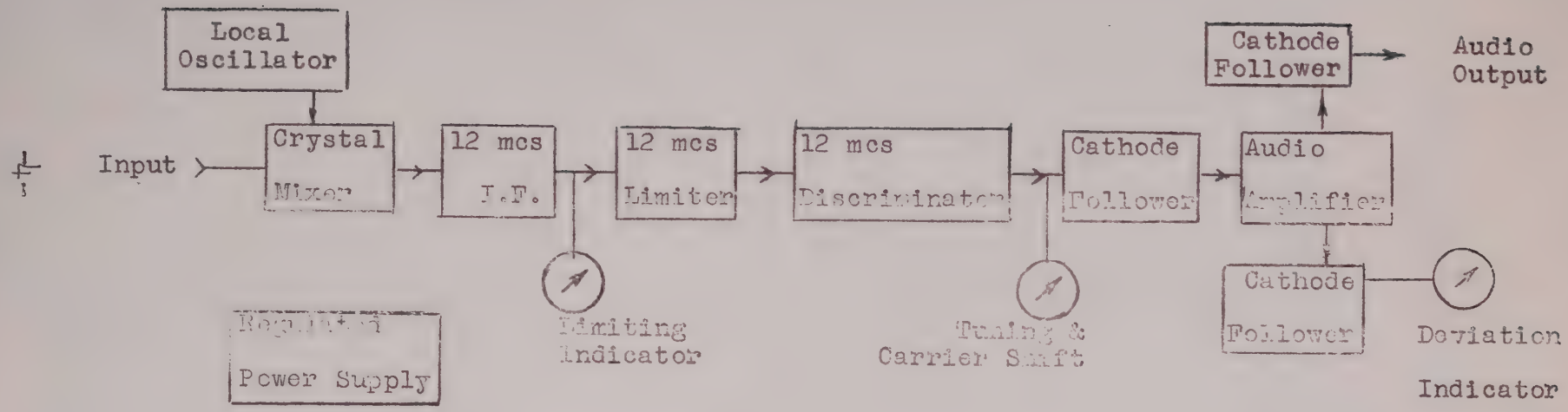
1. Electrical

Carrier Frequency Range:	20 - 1,000mc.
Frequency DeviationRanges:	0-20, 0-50, 0-100, 0-300, and 0-1,000 kc.
Frequency Deviation Accuracy:	± 5% of full scale deflection for modulation frequencies to 70 kc.
Audio Frequency Range:	Audio frequency response flat within ± 1.0db from 50-70,000 cps.
Carrier Shift Range:	0 to ± 250 kc.

Input Sensitivity:	Better than 10 mv from 20 to 500 mc and better than 20 mv from 500 - 1,000 mc measured from 50 ohm source.
Input Impedance:	100 ohms approximate.
Modulation Frequency Output:	1.2 volts adjustable ± 10% corresponding to full scale reading of each of the six deviation ranges.
Modulation Distortion:	Overall modulation distortion introduced by the modulation meter does not exceed 1% up to 300 kc deviation and 3% up to 1,000 deviation.
Noise and Hum:	The combined noise and hum output at the audio output terminals is more than 60 db below 100 kc deviation with a flat weighting across a noise band width of 20 kc.
AM Rejection:	The specified accuracy of indicated frequency deviation is maintained in presence of spurious amplitude modulation up to 30% for modulating frequencies below 70 kc.
Power Requirements:	Approximately 200 watts. 115/230 volts (switchable from the front panel) 50-70 cps.

2. Mechanical

Dimensions:	$10\frac{1}{2}$ x 19 x $14\frac{1}{2}$ deep, relay rack mounting.
Weight:	60 pounds.
Cabinet:	Rack mounted. Transit case available on order.



Block Diagram

Fig. 1

III - INSTALLATION AND OPERATION

1. Installation

This instrument is shipped completely equipped and ready for operation; no special adjustments are required. It is only necessary to plug the power plug into a source of 50 - 60 cycles, 105 - 125 volts power capable of supplying at least 200 watts, and to place the ON-OFF POWER switch in the ON position. If a 210 - 250 volts source is to be used, reverse the voltage plate on the front panel by removing the 2 screws that secure it. Take the plate off, move the switch bat to the other position, and replace the plate with the desired voltage side out. This will automatically assure the user that the proper connections have been made.

2. Controls and Their Function

Front Panel Controls

Control	Function
FREQUENCY RANGE Control	Selects local oscillator tank coil for tuning over any one of 5 ranges. 20 - 55 mcs 55 - 120 120 - 250 250 - 500 500 - 1,000
TUNING Control	Tunes local oscillator over each range.

Control	Function
DEVIATION RANGE Switch (S3)	Selects DEVIATION meter range. There are five range positions: 0 - 20 kc 0 - 50 0 - 100 0 - 300 0 - 1,000
TUNE ± 250 KC Switch (S4)	Selects CARRIER SHIFT meter range. In TUNE position the entire discriminator S-curve may be seen. In ± 250 KC position, the instrument is fine tuned for center frequency and the meter will then read 250 KC full scale.
CAL. ADJ. Control (R98)	Adjusts DEVIATION meter setting when calibrating.
AUDIO ADJ. Control (R103)	Adjusts AUDIO OUTPUT voltage ± 10% of its nominal value.
POWER ON Switch (S1)	Connects the monitor to AC power source when in ON position.
115-230V Switch (S2)	Switches transformer connections for 115 or 230V operation.

3. Operation

a. Preliminary

Set the front panel controls as follows:

Control	Function
DEVIATION RANGE Switch	TUNE position
TUNE ± 250 KC Switch	TUNE position
POWER Switch	Off

b. Starting

Connect the power cable to the A-C power source. Turn on the modulation monitor by throwing the POWER switch to the ON position. Allow one-half hour for warm-up.

CAUTION: Be sure reversible cover plate marking corresponds to line voltage being used.

1. Rotate the FREQUENCY RANGE switch to the desired range.
2. Rotate TUNING control until desired frequency is under hair-line on fiducial.
3. Connect unmodulated signal source to INPUT CONNECTOR.
4. Adjust TUNING control for zero indication on CARRIER SHIFT meter.
5. Rotate TUNE ± 250 KC switch to ± 250 KC position.
6. Readjust TUNING control for zero indication on CARRIER SHIFT meter.
7. Apply modulation to signal source.
8. Carrier shift may be read directly on CARRIER SHIFT meter.
9. Rotate DEVIATION RANGE switch to desired range and read deviation on DEVIATION meter. Always use range which gives highest upscale reading.

IV - THEORY OF OPERATION

1. RF Oscillator

RF Oscillator V1 is a shunt-fed Colpitts oscillator utilizing a 5675 pencil triode. The fundamental oscillator frequency is selected by rotating the FREQUENCY RANGE switch to the desired range and then setting the manually operated tuning control. The frequency of oscillation is determined by both sections of C2 and L3. The coils and pick-up loops for each range are mounted on a low-loss, thermally stable turret. Additional temperature compensation is obtained by means of C114, a bimetallic strip. The high frequency end of each band may be trimmed by means of a special tuning slug (C115), whose shaft is available at the rear of the RF enclosure. The pick-up coils for each range are adjusted to provide optimum mixer-crystal injection voltage over the range, and hence the conversion efficiency is optimized and kept essentially flat. The fundamental frequency range of the oscillator is 30 to 520 mcs. Conversion on the top range (500 to 1,000 mcs) is obtained by utilizing the second harmonic of band 4. The dial is calibrated on all bands in terms of signal frequency.

2. Crystal Mixer

The crystal mixer has been designed to accommodate RF up to 1,000 mcs. Local oscillator voltage is injected through a 150 ohm resistor to provide separation from the signal source and is adjusted for 0.5 ma crystal current on all ranges. Optimum conversion gain (-6db) is thus obtained on fundamental mixing. The optimum conversion gain for second harmonic mixing is approximately 2-3 db worse. A built-in bypass capacitor (C1) at the IF take-off point returns the signal frequency to ground.

3. Intermediate Frequency Amplifier

The IF amplifier is a high gain, wide-band system operating at a center frequency of 12 mcs. It employs five critically-coupled, double-tuned stages; (V2, V3, V4, V5, and V6) and has an overall 3db bandwidth of approximately 3 mcs. Saturation is prevented by a unique delayed AVC circuit. This circuit compares the detected RF output of the last IF to a DC reference level and the first four tubes receive additional negative grid bias whenever the preset DC level is exceeded.

4. Limiters

Two double-tuned, critically-coupled limiter stages (V7, V8), are employed to obtain the required AM rejection characteristics. Crystal diodes CR-3 and CR-4 are used to improve the rectification efficiency of the limiter grid circuits. V9 is a wideband driver amplifier which raises the limiter output to a high level for driving the discriminator. Visual indication

of limiting is provided by a 0-200 UA meter which is deflected by the control grid current of the first limiter tube. R38 sets this meter to the beginning of the red limiting region when an input of 5 mv is provided at the INPUT jack of the modulation meter.

5. Discriminator

The discriminator is a modified Foster-Seely type which is enclosed along with all of its components in T9. The networks consisting of R54 and C64, R55 and C70, R56 and C73, and R57 and C74 are used to obtain the desired linear wide-peak separation characteristics. Center frequency trimmer C71 and peak separation trimmer C67 are available for adjustment at the top of T9. The relatively small diode load resistors R60 and R61 are necessitated by the wide audio response of the system. Carrier shift indication is provided on sensitive zero-center meter whose deflection is proportional to the DC voltage at Pin 3 of the discriminator transformer. Two ranges are provided by S4. The first range displays the entire S-curve; the second range indicates carrier shifts of $\pm$ 250 KCs. R118 is a calibration potentiometer for the $\pm$ 250 KC range.

6. Audio Amplifier

The audio amplifier consists of four RC coupled stages (V10, V11, V12, and V13) and is characterized by cathode follower input and output isolation, extremely low distortion, and a very high degree of stabilization obtained both in the individual unbypassed cathodes and by an overall feedback loop. The amplifier is insensitive to tube replacement and plate voltage changes. Separate cathode followers are used to drive the deviation indicator and to supply audio at the output terminals at an impedance of approximately 1400 ohms. The deviation range switch S3 is located on the low impedance side of cathode follower V10 to allow mounting on the front panel and minimize hum pickup. The deviation meter M-3 is driven by cathode follower V13 through a linear diode detector consisting of C96, R97, CR-7, and R105. R98 is a calibrating potentiometer in series with M-3.

7. Power Supply

The power supply utilizes a full wave bridge rectifier circuit and two stages of capacitor input filtering to provide an unregulated voltage of 240 volts for the plates of the IF and limiter stages. A regulated output of 195 volts is provided for all remaining tube elements. The regulator consists of a series tube (V15), a DC amplifier (V16), and a voltage reference tube (V17). The hum level is of the order of 1-2 millivolts. The filaments of V1 and V13 are regulated by means of the series regulator V14, for additional stability. The regulated output voltage is set by means of R116. The primary of the supply is so arranged that the unit may be operated from either 115V or 230V AC source. A reversible cover plate on the front panel is arranged so that switch S2 is in the appropriate position when the marking on the plate agrees with the line voltage being used.

V - ALIGNMENT AND ADJUSTMENT

1. Alignment Procedures

   a. When any critical circuit in the Modulation Meter is repaired or altered, an alignment check is required. If a circuit is found to need alignment, follow the procedures described in the following paragraphs. Before starting, remove the dust cover from the Modulation Meter. Refer to Figures 3, 4, and 5 for alignment points. Allow 1/2 hour for instrument warm-up before making any adjustments. When additional test equipment is used, allow a warm-up period for this equipment as prescribed in the appropriate instruction manual.

   b. When aligning IF or discriminator transformers be sure to use a non-metallic tuning screwdriver.

   c. Conduct the test in a shielded enclosure. If a shielded room is not available, make the alignment in an area free from stray RF and electrical disturbances.

   d. To assure stable functioning of all test equipment used, maintain a regulated line voltage to the test area.

   e. Follow the alignment procedures in sequence.

2. Adjusting Regulated Supply

   Adjustment of the DC voltage (195 volts) is required before any other alignment is begun.

   a. Connect a DC voltmeter (0-300 volt range) between ground and Pin 6 of V15.

   b. Turn the POWER switch to ON.

   c. Adjust potentiometer R116 (volts Adj.) for a meter reading of 195 volts.

   d. Disconnect the voltmeter.

   NOTE: Power source should be 115VAC, 60 cps.

3. Alignment of IF Amplifier

   The IF Amplifier is best aligned with a swept-frequency signal generator as follows:

   a. Disconnect cable W-3 from the mixer assembly.

b. Set DEVIATION RANGE and CARRIER SHIFT RANGE switches to TUNE position.

c. Connect swept-frequency signal generator to INPUT jack.

d. Set signal generator to center frequency of 12 megacycles and 6 megacycle sweep-width

e. Connect horizontal terminals of cathode ray oscilloscope to sweep voltage of signal generator.

f. Connect vertical terminals of CRO to Pin 7 of V6 using shielded cable and probe as in Fig. (5-1).

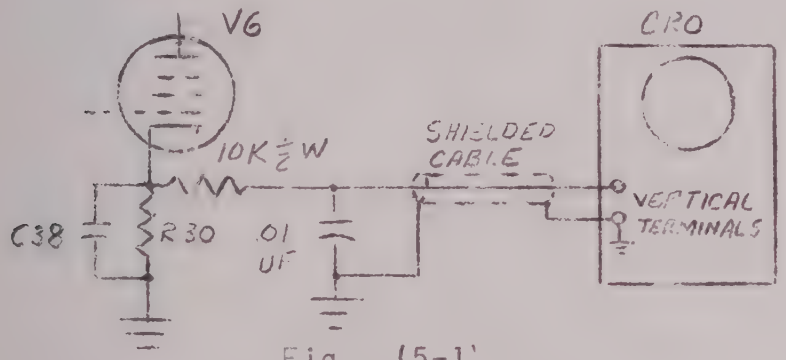


Fig. (5-1)

g. Adjust CRO controls to obtain IF response curve.

h. Loosely couple a grid dip oscillator (or marker generator) set at 12 mcs to V6. A marker should appear at the approximate center of the response curve.

i. Adjust the marker to the 3db points of the response curve. These points fall approximately at 10.5 mcs and 13.5 mcs. (See Fig. 5-2).

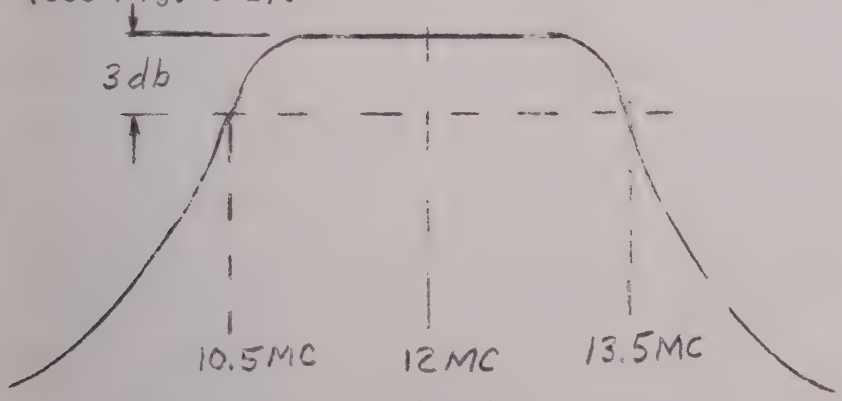


Fig. (5-2)

Note: If the overall response curve is substantially out of alignment, a stage-by-stage procedure will have to be followed. This is a well-known procedure and is outlined in detail in Volume 18, MIT Radiation Laboratory Series, Pages 318-321.

4. Alignment of Limiter Stages

   a. Repeat steps a-d of IF alignment procedures.

   b. Connect vertical terminals of CRO to cathode pin (5) of V9 through cable and probe as in Fig. (5-2) of IF alignment procedures. CAUTION! Keep leads short!

   c. Adjust CRO controls to get response curve on CRO face. Increase level of swept-frequency signal generator until limiting occurs as indicated by sudden widening of the response curve.

   d. Loosely couple a grid dip oscillator (or marker generator) to V9. Check location of markers at 10, 12 and 14 mcs. The response curve should be flat within about ± 1 db in this region. (See Fig. 5-3).

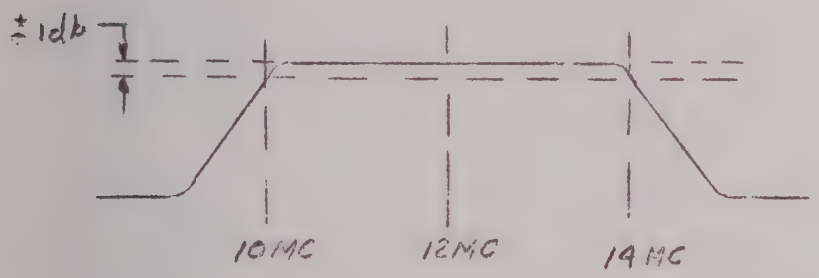


Fig. (5-3)

   e. If the response curve is not reasonably close to Fig. (5-3), adjust trimmers of T6 and T7 to obtain proper curve. Start with T7 and work back to T6.

   f. Disconnect swept-frequency signal generator and CRO probe.

   g. Connect cable W-3 to mixer assembly.

5. Alignment of Discriminator

   a. Repeat steps a-d of IF alignment procedures.

   b. Connect vertical terminals of CRO to ground and junction of R62 and R63 (through 10K, 1/2 W resistor).

   c. Adjust signal level until limiting occurs as indicated by rapid decrease of noise level on CRO.

   d. Adjust CRO controls to obtain response curve which covers about 2/3 of the screen.

   e. Loosely couple a grid dip oscillator (or marker generator) to the 10K probe and check location of 10, 12, and 14 mc markers. These points should comply with Fig. (5-4).

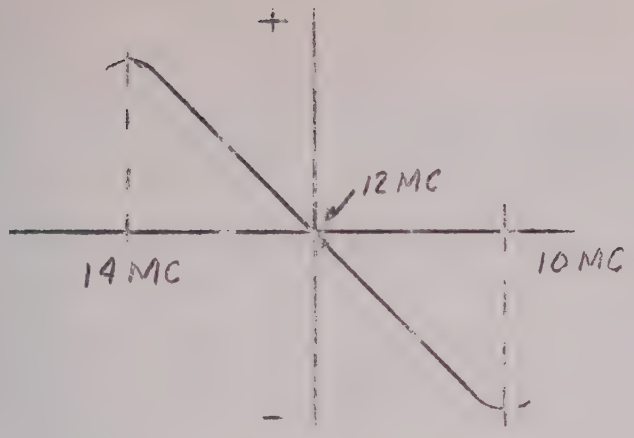


Fig. (5-4)

f. If the discriminator is out of alignment, adjust C-67 for proper peak separation and C-71 for proper center frequency.

g. Follow CARRIER SHIFT calibration procedure for precise discriminator alignment.

h. Disconnect swept-frequency signal generator and CRO probe.

i. Connect cable W-3 to mixer assembly.

j. Connect low distortion FM signal generator to INPUT jack.

k. Connect distortion analyzer to AUDIO OUTPUT terminals.

l. Apply 50 KC deviation (50 mc carrier frequency, 1 KC audio frequency) from signal generator. Measured distortion should be 0.5% or less for proper alignment.

m. Disconnect FM signal generator and distortion analyzer.

6. Adjustment of AVC Delay

a. Connect 50 Ohm Signal Generator (set to 50 mcs) to INPUT jack of the Modulation Meter. Set OUTPUT of generator at 5 mv.

b. Tune in signal on Modulation Meter.

c. Attach DC VOLTMETER (0-10V Range) to center tap of R128.

d. Attach vacuum tube voltmeter (0-10VAC Range) to Pin 3 of T-6 and read signal level.

e. Set voltage on DC meter to same level as in previous step by adjusting R128.

f. Disconnect signal generator and voltmeters.

7. Carrier Shift Meter Calibration

a. Disconnect cable W-2 from mixer assembly and connect to CW signal generator, covering the range 10 to 14 megacycles.

b. Beat external signal generator against crystal calibrator at 12 mcs. (Use 1 mc harmonics of calibrator.)

c. Switch TUNE ± 250 KC switch to ± 250 KC position. The CARRIER SHIFT meter should read zero. If it does not read zero, adjust C-71 slightly.

d. Set external signal generator to 12.250 mcs by zero beating against 250 KC harmonics of crystal calibrator.

e. Adjust R117 for full scale deflection of CARRIER SHIFT meter (± 250 KC).

f. Set external signal generator to 11.750 mcs by zero beating against 250 KC harmonics of crystal calibrator.

g. CARRIER SHIFT meter should read -250 KC. If it does not, adjust C-67 slightly and repeat steps b through f.

h. Reconnect cable W-2 to mixer assembly.

8. Deviation Meter Calibration

a. Connect Modulation Meter INPUT to FM signal generator which is modulated by external audio oscillator.

b. Connect frequency counter to audio oscillator.

c. Set audio oscillator to 4640 cps using counter.

d. Set FM signal generator to 50 mcs.

e. Connect panoramic indicator to signal generator output and obtain indication of carrier on screen.

f. Increase audio oscillator input until carrier goes through third null. (This represents 40 KC deviation.)

g. Disconnect panoramic indicator.

h. Rotate DEVIATION RANGE SWITCH to 50 KC position and note reading on DEVIATION METER.

i. If the METER does not read correctly, turn CAL ADJ. potentiometer (R98) until pointer indicates 40 KC deviation.

NOTE: This calibration may be performed at any other carrier frequency, audio frequency, or deviation.

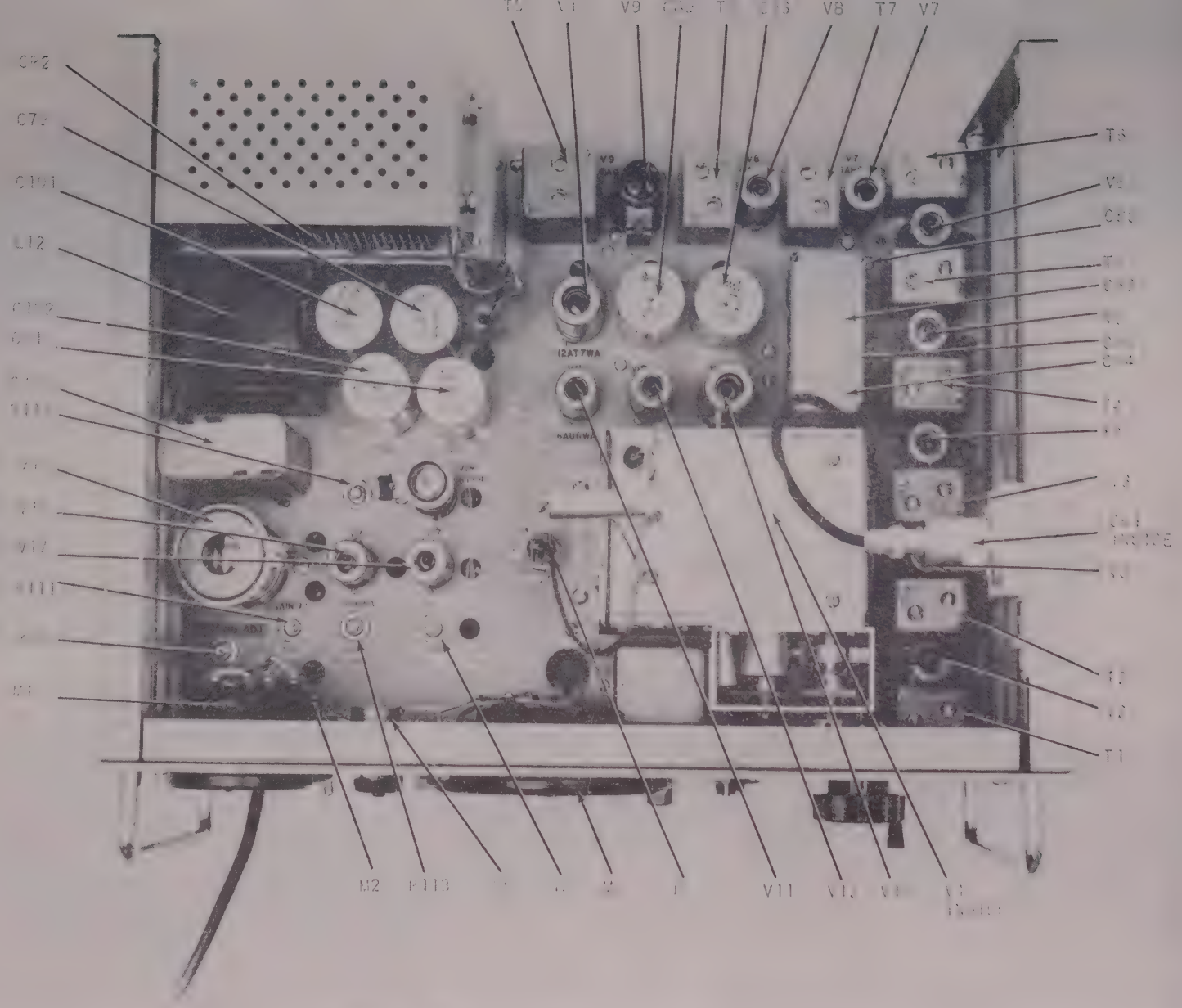


Figure 6. Modulation Meter Top View of Chassis

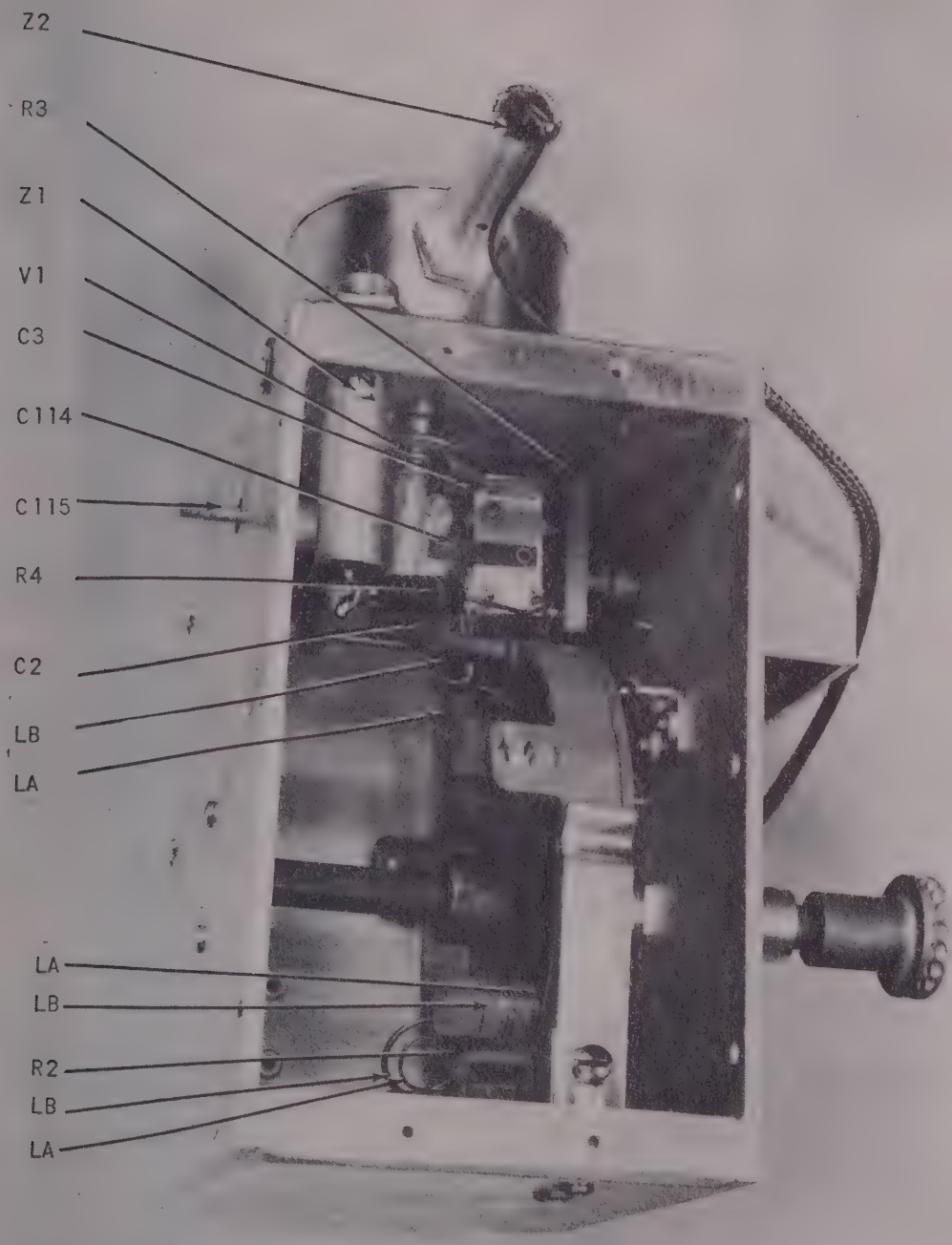


Figure 5. Modulation Meter R-F Oscillator Assembly

TABLE OF REPLACMABLE PARTS

FOR

UNITS UP TO SERIAL NO. 114

Name of Part & Description

CAPACITOR, variable: air;
3.5 to 31.5 uuf capacity
3 in. lg overall
Hammarlund Mfg. Co.
Part No. VU-30 modified

CAPACITOR, variable: ceramic;
4.5 to 25.0 uuf
JAN type CV11A250

CAPACITOR, fixed: disc ceramic;
10,000 uuf, 500 VDCW
MIL type CK63Y103Z

CAPACITOR, fixed: disc ceramic;
1,000 uuf, 500 VDCW
MIL type CK61Y102Z

CAPACITOR, fixed: mica;
100 uuf, 500 VDCW
JAN type CM20C101J

CAPACITOR, fixed: ceramic;
27 uuf, 500 VDCW
JAN type CC20BF270F

CAPACITOR, fixed: ceramic;
10 uuf, 500 VDCW
JAN type CC20UF100K

CAPACITOR, variable: ceramic;
4.5 to 7.0 uuf
JAN type CV11A070

TABLE OF REPLACEABLE PARTS

Name of Part & Description

CAPACITOR, fixed: ceramic;
15 uuf, 500 VDCW
JAN type CC20BF150F

CAPACITOR, fixed: paper;
.25 mfd, 100 VDCW
Cornell-Dubilier
Part No. TWC1D22G4P

CAPACITOR, fixed: paper;
0.03 mfd, 600 VDCW
Cornell-Dubilier
Part No. CUB653

CAPACITOR, fixed: electrolytic;
20-20 mfd, 450 VDCW
JAN type CE42F200R

CAPACITOR, fixed: paper;
2 uf, 400 VDCW
JAN type CP54B1EB205V

CAPACITOR, fixed: mica;
500 uuf, 500 VDCW
JAN type CM20C750J

CAPACITOR, fixed: paper;
1 uf, 400 VDCW
JAN type CP61B1EE105V

CAPACITOR, fixed: paper;
.002 uf, 400 VDCW

CAPACITOR, fixed: paper;
.01 mfd, 600 VDCW
Cornell-Dubilier
Part No. CUB651

CAPACITOR, fixed: paper;
2 uf, 100 VDCW
JAN type CP55B1EB205V

CAPACITOR, fixed: paper;
4 uf, 600 VDCW
JAN type CP70B1EF405K

CAPACITOR, fixed: paper;
.5 mfd, 400 VDCW
Aerovox Corp.
Part No. Aerolite P123NGP

Name & Description of Part

CAPACITOR, fixed: mica;
150 uuf, 500 VDCW
JAN type CM20C151J

CAPACITOR, fixed: ceramic;
100 uuf, 500 VDCW
JAN type CC26CH101K

CAPACITOR, fixed: ceramic;
5 uuf, 500 VDCW
JAN type CC21CH050K

CAPACITOR, temperature compensating; 7/8 in. lg, 3/16 in. wide, 0.023 in. thick
NLIC Dwg. No. 153-A-262

RESISTOR, fixed: film;
150 ohms ± 1%, 1/4 Watt,
Mepco, Inc. Part No. C10-150

RESISTOR, fixed: composition;
47,000 ohms ± 10%, 1/2 Watt,
JAN type RC20BF473K

RESISTOR, fixed: composition;
6800 ohms ± 10%, 2 Watt,
JAN type RC41BF682K

RESISTOR, fixed: composition;
2700 ohms ± 10%, 1/2 Watt,
JAN type RC20BF272K

RESISTOR, fixed: composition
47 ohms ± 10%, 1/2 Watt
JAN type RC20BF470K

RESISTOR, fixed: composition;
22,000 ohms ± 10%, 1 Watt
JAN type RC30BF223K

RESISTOR, fixed: composition;
470 ohms ± 10%, 1/2 Watt
JAN type RC20BF471K

RESISTOR, fixed: composition;
150 ohms ± 10%, 1/2 Watt
JAN type RC20BF151K

TABLE OF REPLACEABLE PARTS

Name & Description of Part

RESISTOR, fixed: composition;
68,000 ohms ± 10%, 1 Watt
JAN type RC30BF683K

RESISTOR, fixed: composition;
2200 ohms ± 10%, 1/2 Watt
JAN type RC20BF222K

RESISTOR, fixed: composition;
120 ohms ± 10%, 2 Watt
JAN type RC40BF121K

RESISTOR, fixed: composition;
10,000 ohms ± 10%, 1/2 Watt
JAN type RC20BF103K

RESISTOR, variable: composition;
250 ohms ± 10%, 1/4 Watt
JAN type RV2ATSA251A

RESISTOR, fixed: composition;
1800 ohms ± 10%, 1/2 Watt
JAN type RC20BF182K

RESISTOR, fixed: composition;
12,000 ohms ± 10%, 2 Watt
JAN type RC40BF123K

RESISTOR, fixed: composition;
15,000 ohms ± 10%, 1/2 Watt
JAN type RC20BF153K

RESISTOR, fixed: composition;
15,000 ohms ± 10%, 2 Watt
JAN type RC40BF153K

RESISTOR, fixed: composition;
33 ohms ± 10%, 1 Watt
JAN type RC30BF330K

RESISTOR, fixed: composition;
6800 ohms ± 10%, 2 Watt
JAN type RC40BF682K

RESISTOR, fixed: composition;
1,000 ohms ± 10%, 2 Watt
JAN type RC40BF102K

TABLE OF REPLACEABLE PARTS

Name of Part & Description

RESISTOR, fixed: film;
3300 ohms ± 1%, 1/2 Watt
MIL type RN15R3301F

RESISTOR, fixed: film;
500,000 ohms ± 1%, 1/2 Watt
MIL type RN15R5003F

RESISTOR, fixed: film;
MIL type RN15R1002F
10,000 ohms ± 1%, 1/2 Watt

RESISTOR, fixed: film;
680,000 ohms ± 1%, 1/2 Watt
MIL type RN20R6803F

RESISTOR, fixed: film;
33,000 ohms ± 1%, 1/2 Watt,
MIL type RN20R4702F

RESISTOR, fixed: composition;
470,000 ohms ± 10%, 1/2 Watt
JAN type RC20BF474K

RESISTOR, fixed: composition;
100 ohms ± 10%, 1/2 Watt
JAN type RC20BF101K

RESISTOR, fixed: composition;
10,000 ohms ± 10%, 1 Watt
JAN type RC30BF103K

RESISTOR, FIXED: composition;
3,300 ohms ± 10%, 1 Watt
JAN type RC30BF332K

RESISTOR, fixed: composition;
1000 ohms ± 10%, 1 Watt
JAN type RC30BF102K

RESISTOR, fixed: film;
120 ohms ± 1%, 1/2 Watt
MIL type RN20R1200F

RESISTOR, fixed: film;
280 ohms ± 1%, 1/2 Watt
MIL type RN20R2800F

TABLE OF REPLACEABLE PARTS

Name of Part & Description
RESISTOR, fixed: film; 800 ohms ± 1%, 1/2 Watt, MIL type RN20R8000F
RESISTOR, fixed: film; 1200 ohms ± 1%, 1/2 Watt, MIL type RN20R1201F
RESISTOR, fixed: film; 3600 ohms ± 1%, 1/2 Watt, MIL type RN20R3601F
RESISTOR, fixed: film; 100 ohms ± 1%, 1/2 Watt, MIL type RN20R1000F
RESISTOR, fixed: composition; 120 ohms ± 10%, 1/2 Watt, JAN type RC20BF121K
RESISTOR, fixed: composition; 1,000 ohms ± 10%, 2 Watt, JAN type RC40BF102K
RESISTOR, fixed: composition; 27,000 ohms ± 10%, 1 Watt, JAN type RC30BF273K
RESISTOR, fixed: film; 51.1 ohms ± 1%, 1/2 Watt, MIL type RN20R51R0F
RESISTOR, fixed: film; 5600 ohms ± 1%, 1/2 Watt, MIL type RN20R5601F
RESISTOR, fixed: film; 6800 ohms ± 1%, 1/2 Watt, MIL type RN20R6801F
RESISTOR, fixed: film; 1000 ohms ± 1%, 1/2 Watt, MIL type RN20R1001F
RESISTOR, fixed: film; 300 ohms ± 1%, 1/2 Watt, MIL type RN20R3000F
RESISTOR, fixed: composition; 10,000 ohms ± 10%, 2 Watt, JAN type RC40BF103K

TABLE OF REPLACEABLE PARTS

Name of Part & Description

RESISTOR, variable: composition;
50,000 ohms ± 10%, 1/4 Watt
JAN type RV2ATSA503A

RESISTOR, fixed: film;
220,000 ohms ± 1%, 1/2 Watt
MIL type RN20R2203F

RESISTOR, fixed: film;
4,700 ohms ± 1%, 1/2 Watt
MIL type RN20R4701F

RESISTOR, fixed: composition;
82,000 ohms ± 10%, 1/2 Watt
JAN type RC20BF823K

RESISTOR, variable: composition;
1,000 ohms ± 10%, 1/4 Watt
JAN type RV2ATSA102A

RESISTOR, fixed: film;
40,000 ohms ± 1%, 1/2 Watt
MIL type RN20R4002F

RESISTOR, fixed: composition;
10 ohms ± 10%, 1 Watt
JAN type RC30BF100K

RESISTOR, fixed: composition;
65 ohms ± 10%, 1 Watt
JAN type RC30BF650K

RESISTOR, fixed: composition;
150,000 ohms ± 10%, 1 Watt
JAN type RC30BF154K

RESISTOR, Variable: composition;
100,000 ohms ± 10%, 1/4 Watt
JAN type RV2ATSA104A

RESISTOR, fixed: composition;
100,000 ohms ± 10%, 1 Watt
JAN type RC30BF104K

RESISTOR, fixed: composition;
82,000 ohms ± 10%, 1 Watt
JAN type RC30BF823K

TABLE OF REPLACEABLE PARTS

Name of Part & Description

RESISTOR, fixed: composition;
51,000 ohms ± 10%, 1 Watt
JAN type RC30BF513K

RESISTOR, variable: composition;
10,000 ohms ± 10%, 1/4 Watt
JAN type RV2ATSA103A

RESISTOR, fixed: composition;
1,000 ohms ± 10%, 1/2 Watt
JAN type RC20BF102K

RESISTOR, fixed: composition;
51,000 ohms ± 10%, 1/2 Watt
JAN type RC20BF513K

RESISTOR, variable: composition;
1,000,000 ohms ± 10%, 1/4 Watt
JAN type RV2ATSA105A

LAMP, incandescent; 6.3V,
miniature bayonet
General Electric Part No. 47

LIGHT, indicator; red frosted lens,
w/o lamp, solder lug connections
with mounting hardware,
Dial Light Co. Part No. 81410-121

FUSE, cartridge; 2-1/2 amp
125 volts, MIL type
MIL-F-15160A

FUSEHOLDER, post: extractor;
Bussman Mfg. Co. Part No. HKP-HBL

CRYSTAL DIODE:
JAN type 1N21B

RECTIFIER, selenium;
voltage doubler, mounts by stud
Radio Receptor Corp.
Part No. Q13D1S5H

CRYSTAL DIODE;
JAN type 1N69

TABLE OF REPLACEABLE PARTS

Name of Part & Description
CRYSTAL DIODE; JAN type 1N138A
COIL, pick-up; 51 ohm resistor in series with one leg, coil one turn 3/8 in. dia. NLIC Dwg No. 153-A-258
REACTOR, power; 200 ma, 8 Henry, NLIC Dwg No. 153-B-008
REACTOR, power; 3 Hy, 120 ma, NLIC Dwg. No. 153-B-240
CHOKE, filament; 3.35 UH Electrical Reactance Corp. Part No. [illegible]-177
ELECTRON TUBE, 5675
ELECTRON TUBE, 5654/6AK5
ELECTRON TUBE, 6AH6
ELECTRON TUBE, [illegible]
ELECTRON TUBE, 12AT7
ELECTRON TUBE, 6AU6
ELECTRON TUBE, 5814/12AU7
ELECTRON TUBE, 6TF4
ELECTRON TUBE, 6080/6AS7
ELECTRON TUBE, 5651
SWITCH DPST, ST52K, Power Switch
SWITCH, Deviation Range, NLI Dwg. No. 153-[illegible]-102
SWITCH, Carrier Shift Range, NLI Dwg. No. 153-B-178
R.F. CONNECTOR, UG-909/U
R.F. CONNECTOR, UG-535/U
R.F. CONNECTOR, UG-625/U

TABLE OF REPLACEABLE PARTS

Name of Part & Description

R.F. CONNECTOR, UG88/U

IF TRANSFORMER ASSEMBLY
NLI Dwg. No. 153-B-079

DISCRIMINATOR ASSEMBLY
NLI Dwg. No. 153-C-085-1

TRANSFORMER POWER
NLI Dwg. No. 153-C-005

METER, Limiting Ind.
NLI Dwg. No. 153-B-301, Issue D

METER, Carrier Shift
NLI Dwg. No. 153-A-300

METER, Deviation
NLI Dwg. No. 153-A-302, Issue A

MIXER ASSY.
NLI Dwg. No. 153-B-175

COIL, NLI Dwg. No. 153-A-21?

CAPACITOR CONTACT, NLI Dwg. No. 153-A-2[illegible]

CAPACITOR CONTACT, NLI Dwg. No. 153-A-[illegible]

COIL ASSY.
NLI Dwg. No. 153-A-255, Issue A

COIL ASSY.
NLI Dwg. No. 153-A-256, Issue A

COIL ASSY.
NLI Dwg. No. 153-A-257

FILTER ASSY., NLI Dwg. No. 153-A-174-1

FILTER ASSY., NLI Dwg. No. 153-A-174-2

29 AUGUST 1968

NEW LONDON INST. CO.
DIV. OF CRESCENT COMM. CORP.
43 HEMPSTEAD STREET
NEW LONDON, CONN. 06321
ATTN: HOWARD BROOKS, SALES

DEAR SIR:

I RECEIVED THE MANUAL FOR THE F.M. MODULATION MONITOR, MODEL 257A. I"M SOMEWHAT CONFUSED, HOWEVER, IN THAT THERE IS NO SCHEMATIC COVERING THE INSTRUMENT INCLUDED IN THE BOOK. ALSO, THERE ARE SEVERAL ERRORS THAT ARE DIFFICULT TO JUSTIFY IN MY MIND AS FOLLOWS: IN THE VOLTAGE CHART AS WELL AS THE RESISTANCE CHART, V10 IS NOT A 6U8, V12 IS NOT A 6AU6, V13IS NOT A 6AK5, V14 IS NOT A 12AU7, THE 6080 IS NOT V17,V18 IS NOT A 6BH6, THE 5651 IS NOT V19, AND THE 6TF4 IS NOT V20.

I HAVE TO ASSUME THAT V1 IS THE 5675 BECAUSE THERE ARE NO INSTRUCTIONS FOR THE PROPER PROCEEDURES FOR DISASSEMBLY OR SERVICING THE R.F. OSCILLATOR UNIT.

MY UNIT HAS NO POS.-NEG. PEAK SWITCH TO SWITCH THE DEVIATION METER FOR THE READING OF EITHER PEAK SEPARATELY. THERE IS, HOWEVER, A SWITCH ON THE FRONT PANEL THAT IS LOCKED IN THE DOWN POSITION BY A RED PIECE OF METAL THAT HAS "115 VOLTS" ENGRAVED ON IT. THIS SWITCH IS LOCATED ON THE LOWER LEFT CORNER OF THE FRONT PANEL.

ALL OF THIS, PLUS THE LACK OF A SCHEMATIC,AS I SAY, HAS ME CONFUSED. ACCORDING TO THE TUBE TYPES LISTED BESIDE THE VARIOUS TUBES IN THE UNIT, THE PROPER TUBES ARE IN THE PROPER HOLES.

THE VOLTAGES SEEM REASONABLE AND THERE IS SOME VERY BROADBAND UNTUNABLE RECEPTION HEARD IN THE 'PHONES AT THIS TIME, SO I BELIEVE THAT THE RF OSCILLATOR IS THE WORM IN THEOINTMENT AT THE PRESENT TIME(THE WHOLE THING QUIT THE DAY AFTER I ORDERED THE BOOK).

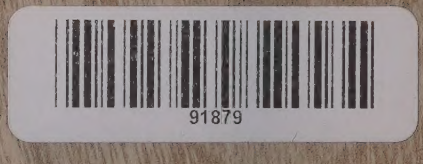
THEREFORE AS YOU CAN SEE, I NEED MORE INFORMATION, PLEASE.

THE SERIAL # IS 81

SINCERELY,

M.S.MARTIN
BASE SUPPORT MGR.
% SHERWOOD PRODUCTS
2416 AMSLER, TORRANCE,
CALIFORNIA, 90505

G.M. - 9/12
make up new
Manual w/ right
schematic & ship. N/C.
LHB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